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cc:

Subject: Update on Calpuff Testing- ND Increment Modeling

As you may recall, last week I sent a note to Steve Weber indicating that in testing his modeling inputs I found that the current version of Calpuff (2000) gave higher concentrations than the 1997 version he used in his work. I sent my files to Steve and to John Vimont at NPS and they have verified that the results are related to software changes in the current "guideline" version of Calpuff. In general, when default input options are selected the two models give exactly the same results. In this case, however, ND did **not** use EPA default options. The part of the model that calculates turbulence/stability (i.e. how fast the plume is diluted in the atmosphere) was modified in the 2000 version when stability is calculated using the ND selected option of micrometeorological data. We are checking with the model developer (Earthtech) and OAQPS to see if the differences have a technically sound basis, or are due to a programming error. If technically sound, I think EPA should use the most recent "guideline" version (2000) of the model for our North Dakota model runs. Note that this will result in higher concentrations from the model..most likely 5 to 10 percent higher, but possibly up to 48 percent higher at some locations. I will make some more model runs to estimate the cumulative change on concentrations for all increment sources after we hear from Earthtech.

In other model tests, I was interested in testing the difference in modeling results **if** ND had used entirely EPA default values in their modeling. As shown in the attached table the differences were very large with default-value concentrations typically 50 percent higher or more. I don't think we will hear any industry representatives demanding the use of EPA default options! The State compared their modeling results with actual measured SO2 data at TRNP to justify their selection of input options....thus it is hard to argue that they are not appropriate. But it is useful to know that the State has applied the model using options that cause the model to predict much lower concentrations than would typically be the case in other applications nationwide. The sparse SO2 monitoring data in ND does not provide a "bright line" to precisely calibrate the model....so we could still justify the somewhat higher values from Calpuff 2000 as discussed above.

modtest1.wpd

Table 1. Results of modeled comparisons between 1997 and 2000 version of Calpuff and the use of regulatory default settings in the model. Antelope Valley Station emissions and 1994 meteorology data were used in this sensitivity test. Concentrations are the maximum predicted values (ug/m3) in any ND/MT Class 1 area (49 Class 1 receptors were modeled).

	1997 Calpuff Model ND Settings	1997 Calpuff Model EPA Default Settings		2000 Calpuff ND Settings	
	Conc. (ug/m3)	Conc.	% Change	Conc.	% Change
3 hr max	6.75	8.98	+ 33	7.81	+ 15
3 hr 2nd hi	5.95	7.42	+ 25	6.57	+ 10
3 hr 3rd hi	5.54	6.28	+ 13	5.76	+ 4
3 hr 4th hi	4.24	6.21	+ 46	5.70	+ 34
24 hr max	1.92	3.99	+208	2.85	+ 48
24 hr 2nd hi	1.70	2.81	+ 65	1.76	+ 4
24 hr 3rd hi	1.60	2.74	+ 71	1.69	+ 6
24 hr 4th hi	1.53	2.35	+ 153	1.67	+ 9